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On the Invisible Threat: Bacteriologists in Fiction and Periodical Advertisements, 1894-1913.

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Abstract

This article explores the values attributed to the new science of bacteriology in five early stories of bacteriologists: H. G. Wells' 'The Stolen Bacillus' (1894), T. Mullett Ellis's *Zalma* (1895), W. L. Alden's 'The Purple Death' (1895), Algernon Blackwood's 'Max Hensig' (1907), and Arthur Conan Doyle's 'The Adventure of the Dying Detective' (1913). I argue that the new science becomes a vehicle for anxieties about anarchist terrorism and German militarism. Responding to Martin Willis's (2011) account of the microscope's creative function at the *fin de siècle*, I suggest that the distinctive qualities of bacteriological science inflect the plot and style of these tales, as well as the nature of their fictional antagonists. These qualities include the magnification of an otherwise invisible threat and the ensuing distortion of the scientist's moral judgement, the discrepancy between microbial size and potency, and German dominance in the field. The formal mechanisms of the texts, their patterns of tension and revelation, are also shown to interact with the new dynamics of bacteriological science and its play of visibility and invisibility. Comparing these texts with contemporaneous advertisements, I point out that the bacteriologist was simultaneously portrayed, to the same audiences, as a vector of threat and a trustworthy authority underwriting new commercial products. This divergence suggests the pliancy of bacteriology's cultural significance and the limited influence of fiction on commercial uses of bacteriology. I argue that such fiction exploits limited public knowledge of the bacteriologist to develop an enduring motif of bacteriology as a moral and political danger.

KEYWORDS: Bacteriologist, Bacteriology, Germany, Anarchism, Invisibility, Advertisement, Wells, Ellis, Doyle, Alden, Blackwood.

The emergence of bacteriology in Europe in the 1880s and 1890s saw the science promptly located among a range of political, social, and moral concerns. In a dramatic dialogue, ‘The Fortress of Life’ by ‘A Family Doctor’ from 1885—a year before the first recorded use of the word bacteriologist—we find a discussion of ‘germ-hunters’: ‘Yes, the French are great germ-hunters, and their experimenting medical men have done a great deal of good for humanity.’¹ An article in the *New York Times* from 1895 uses the same explorer-cum-huntsman trope in the title ‘Hunting the Bacteria’, and begins ‘The world's mightiest hunters in the last thirty years have been those who have pursued infinitesimal game – who have found, caught, killed, or held captive those curious little organisms called microbes or bacilli.’² With bacteria securely cast as antagonists, such commentaries cast bacteriology and its practitioners as powerfully heroic: they are representatives of their country who also pursue the bacterial enemies of a wider humanity.

Contemporary fiction, however, repeatedly presented a different version of the profession, with bacteriologists’ hostility turned away from pathogenic bacteria and towards people. Stories of bacteriologists portray a science undertaken by morally questionable, even outright criminal figures. The bacteriologist is cast as the successor to the vivisectionist, and the intimate of the political terrorist. This article describes a number of fictional bacteriologists of the *fin de siècle*, arguing that they represent a distinctive subspecies within that broader genus of scientists described by Peter Broks as, ‘at best, unemotional and detached, and, at worst, inhuman and insane’.³ Juxtaposing five examples from 1894 to 1913 with the advertisements alongside which they were published, I argue that the bacteriologist had, even up to the start of the First World War, a contradictory reputation. In fiction he or she was repeatedly shown as a terrorist, a murderer, or a selfish danger to others, armed with a fatal new weapon, whereas in advertisements s/he becomes and remains a stable and marketable figure of authority and security, practising a new life-saving science. Contrary to the connection that Laura Otis draws

¹ A Family Doctor, ‘The Body’s Invisible Enemies: The Fortress of Life—II’, *Cassell’s Family Magazine*, March 1885, p. 214.

² F. D. R., ‘Hunting the Bacteria: Remarkable Growth of the New Science of Bacteriology’, *The New York Times*, 3 Feb 1895, p. 24. The earliest dedicated history of bacteriology in English, Paul de Kruif’s *The Microbe Hunters* (1926), retains this language of bacterial violence, combining the martial and the sporting. A similar bellicosity sounds in the titles of Joseph W. Bigger’s *Man Against Microbe* (1939) and J. D. Ratcliff’s plural *Men Against Microbes* (1940), the former beginning, ‘many of the diseases from which we suffer are due to the invasion of the body by microbes’. (Joseph W. Bigger, *Man Against Microbe*, [London: English Universities Press, 1939], p. 5).

³ Peter Broks, ‘Science, media and culture: British magazines, 1890-1914’, *Public Understanding of Science*, 2, (1993), 123-39 (p. 127). It is thus noticeable, for example, that Allen Conrad Christensen makes no mention of bacteria, bacteriology or its practitioners in *Nineteenth-Century Narratives of Contagion: ‘Our Feverish Contact’*, Taylor and Francis, 2005. ProQuest Ebook Central, <<https://ebookcentral.proquest.com/lib/oxford/detail.action?docID=308860>> [Accessed 3 October 2017]. The relation of germ theory and contagion is addressed clearly by Margaret Pelling, ‘The Meaning of Contagion: Reproduction, Medicine and Metaphor’, in *Contagion: Historical and Cultural Studies*, ed. by Alison Bashford and Claire Hooker (London: Routledge, 2001), pp. 15-38. On non-fictional texts regarding anticontagionism, see Elaine Freedgood, *Victorian writing about risk: imagining a safe England in a dangerous world* (Cambridge: Cambridge University Press, 2000).

between metaphors of bacterial science and colonial invasion, I argue that bacteriology is more typically used in fiction and advertising of the period in one of two ways: as either a terrorist threat deployed by agents of international anarchism or Germany, or as a guarantor of scientific modernity, cleanliness and quality.⁴

These four stories and one novel constitute a distinctive trend, creating a lasting motif of the dangerous bacteriologist, and using key features of the bacteriological as setting, mechanism and metaphor for the subterfuge of political terrorism or for European international aggression. These features include the radical discrepancy between bacterial size and potency, the invisibility of the newly identified threat, the hardness and autonomy of bacteria, and the fact of German dominance in the new field. These texts identify in bacteriology not only a science that may be appropriated for nefarious purposes, but one dangerous in its own right. I argue that these stories articulate such fears formally as well as thematically, repeatedly exploiting the structural good fit of bacteriology and fiction, developing narrative tension via bacteriology's pattern of invisibility and revelation, unseen infection and spectacular symptom.

The best-known fictional bacteriologist is Culverton Smith, villain of the 1913 Sherlock Holmes story 'The Adventure of the Dying Detective'.⁵ Dr Watson is called by Mrs Hudson to visit an apparently fatally ill Holmes, who has stopped eating, has a feverish look, crusted lips, and a croaking voice. Holmes uses Watson's desperate worry to lure Smith, a plantation owner and murderer, into a witnessed confession. Smith is, crucially, an amateur bacteriologist, and explains to Watson,

'[Holmes] is an amateur of crime, as I am of disease. For him the villain, for me the microbe. There are my prisons,' he continued, pointing to a row of bottles and jars which stood upon a side table. 'Among those gelatine cultivations some of the very worst offenders in the world are now doing time.'⁶

Watson is initially deceived in his diagnosis of Holmes's illness: the detective presents 'a deplorable spectacle', his 'gaunt, wasted face staring at me from the bed'.⁷ Watson is not,

⁴ Laura Otis, 'The Empire Bites Back: Sherlock Holmes as an Imperial Immune System', *Studies in 20th Century Literature*, 22.1 (1998), 3/33. <<http://dx.doi.org/10.4148/2334-4415.1433>>

⁵ A. Conan Doyle, 'The Adventure of the Dying Detective', *Strand Magazine*, December 1913, pp. 604-14. The story was first published in the United States in *Collier's Weekly Magazine* in November 1913.

⁶ Doyle, 'Dying Detective', p. 610.

⁷ Doyle, 'Dying Detective', p. 605-6.

however, allowed to examine his friend properly, Holmes self-diagnosing that he has been infected with ‘a coolie disease from Sumatra’ that is ‘infallibly deadly and [...]ontagious by touch’.⁸ Holmes’s adversary is, as is the case in stories such as *The Sign of the Four* (1890), a colonial one; the danger is not Germany or the working class but an ‘Eastern’ epidemic.⁹

In *Membranes* (1999) Laura Otis identifies in fiction a recurring drama according to which ‘Westerners became horrified when the cultures, peoples, and diseases they had engulfed began diffusing, through their now permeable membranes, back toward their imperial cell bodies’.¹⁰ Noting Doyle’s enthusiastic essay ‘Dr Koch and His Cure’ and Koch’s likely role as a source for Holmes, Otis reads the bacteriological method as a tool of imperial governance also practised by the fictional detective.¹¹ Otis argues that Holmes embodies both the bacteriologist and the ‘imperial leucocyte or antibody, sticking closely to the infiltrator he detects.’¹² This colonial interpretation of Doyle’s work has become influential.¹³ However, if Doyle’s admiration for Koch, bacteriology, and the imperialist project remained undimmed from his medical training, his perception of the colonial subject as the principal threat to the British Empire was, by 1913, out of line with contemporaneous political tensions.¹⁴ Only the year before the outbreak of war, following decades of escalating Anglo-German antagonism, Doyle presents bacteriology as an actor in Britain’s new imperialist project.¹⁵ Insofar as bacteriology is dangerous, Doyle implies, its risk lies in the capacity for appropriation and abuse by a disgruntled British colonist. As I shall show, however, this colonial framework marks a departure from the more typical uses of the

⁸ Doyle, ‘Dying Detective’, p. 606.

⁹ Holmes’s adversary in *The Sign of the Four* is the diminutive, albeit not microscopic, Andaman islander Tonga. An unusually small imperial ‘specimen’ whose existence is inferred by Holmes as the only reasonable solution to the murder; Holmes’s reasoning process resembles the contemporaneous bacteriological search for the specific pathogens of infectious disease.

¹⁰ Laura Otis, *Membranes: Metaphors of Invasion in Nineteenth-Century Literature, Science, and Politics* (Baltimore: Johns Hopkins University Press, 1999) p. 5.

¹¹ Arthur Conan Doyle, ‘Dr Koch and His Cure’, *The Review of Reviews* 1, 1890, pp. 552-56. This case is expressed most recently in Thomas Goetz, *The Remedy: Robert Koch, Arthur Conan Doyle, and the Quest to Cure Tuberculosis* (New York: Gotham Books, 2014).

¹² Otis, 1998.

¹³ Other readings in this vein include Susan Cannon Harris, ‘Pathological Possibilities: Contagion and Empire in Doyle’s Sherlock Holmes Stories’ *Victorian Literature and Culture*, 31.2, (2003), pp. 447-466, and Upamanyu Pablo Mukherjee, “‘Out-of-the-Way Asiatic Disease’: Contagion, Malinger, and Sherlock’s England”, in *Literature of an Independent England*, ed. by C. Westall and M. Gardiner (Palgrave Macmillan, London, 2013), pp 77-90.

¹⁴ Doyle would later contribute to the propaganda machine the anti-German ‘His Last Bow’ (1917), though this has neither a bacteriological nor a scientific element. A colonial exception to my own reading is W. Somerset Maugham *The Painted Veil* (1925), whose bacteriologist protagonist Walter Fane would—but does not—kill his unfaithful wife by taking her into a cholera outbreak in China. This story is, I suggest, differently inflected by its historical moment: neither the British Empire nor the German threat were in the 1920s what they had been at the turn of the century.

¹⁵ Historical studies of Anglo-German antagonism are numerous and diverse. The agenda-setting text in the field is Paul M. Kennedy, *The Rise of the Anglo-German Antagonism, 1860-1914*, (London: Allen & Unwin, 1980). The subsequent trajectory of scholarship is helpfully traced in Jan Rüger, ‘Revisiting the Anglo-German Antagonism’, *Journal of Modern History*, 83.3 (September 2011), 579-617.

bacteriologist in fiction, which are dominated by worries about German militarism and anarchist terrorism, rather than colonial rebellion or invasion.

In *Vision, Science and Literature, 1870-1920* (2011) Martin Willis has challenged the tendency to read the relation of the period's scientific and literary visual cultures as that between objective and subjective observations. Of particular relevance to the present argument is his reading of the microscope as a technology carrying creative and imaginative potency. Willis argues that Gothic fiction, especially the vampire stories of Sheridan le Fanu and Bram Stoker, uses microscopy to generate a controversy about the microscopic mechanisms of infection: a debate that becomes imbued with wider social and political concerns. This controversy affected the proposed foundation of a British Institute for bacteriology, whose critics were concerned by 'the potential moral and ethical infection of French and German bacteriology'.¹⁶ Crucially for the current argument, in contradistinction to Otis's reading of bacteriology as a trope for 'relationships between colonial power and colonized powerlessness', Willis resituates bacteriological discourse amidst intra-European rivalries.¹⁷ This article develops this strand of Willis's argument by examining, not Gothic tropes, but literal depictions of bacteriologists, who are repeatedly and diversely depicted in a European, rather than colonial, framework.

I. Bacteriologists and Anarchism

H. G. Wells's early short story 'The Stolen Bacillus', published in *Pall Mall Budget* in 1894, articulates how bacteriology's isolation of specific pathogens magnifies rather than dispels the fear of epidemic.¹⁸ Responding to Martial Bourdin's anarchist plot at Greenwich in February 1894, the text relates how a would-be terrorist steals a vial containing a cholera culture from the laboratory of a 'Bacteriologist', whose profession provides his only name. When the terrorist's panicked flight leads to the vial's premature destruction, the Anarchist—who is likewise given no other name—quickly decides to become a human vector, infecting himself by drinking the remaining drops of the solution. Half-dressed, the Bacteriologist pursues the Anarchist across London in a cab, the Bacteriologist's wife chasing him in turn, in a forerunner of the spectacular cinematic chase sequence. The Anarchist's scheme fails, but not because of the moral courage of the pursuing scientist acting as a guardian of public health. The story's late twist reveals that the

¹⁶ Martin Willis, *Vision, Science and Literature, 1870-1920: Ocular Horizons* (Pittsburgh: University of Pittsburgh Press, 2011), p. 47.

¹⁷ Willis, 2011, p. 45. Otis, 1999, p. 5.

¹⁸ H. G. Wells, 'The Stolen Bacillus', *Pall Mall Budget*, 21 June 1894. Citations from H. G. Wells, *The Complete Short Stories of H. G. Wells* (London: Ernest Benn, 1966) pp. 195-202.

scientist has lied: he boasted that the vial contained a deadly pathogen when it contained a bacterium that would inadvertently turn its victims blue but leave them otherwise unharmed. The long and dangerous pursuit was not, it transpires, to avert mass murder but to save the ‘trouble and expense’ for the scientist of ‘preparing some more’.¹⁹

In this way, the story makes marked use of spectacle and visibility, combining the misdirections of the plot with the inscrutability of both of the central figures to deepen the text’s intimacy with the spy and thriller genres.²⁰ Unlike Joseph Conrad’s *The Secret Agent* (1906), Wells does not figure the Anarchist as a ‘definitively “foreign” body’.²¹ Rather, ‘The Stolen Bacillus’ makes a point of rendering the Anarchist’s appearance fundamentally ambiguous: ‘the man was not a Teutonic type nor a common Latin one’, only definitively ‘morbid’.²² The story is not, I suggest, a vehicle for racial anxieties; rather, the Anarchist’s resistance to classification is expressive of the hidden quality of his political radicalism: it is his blending in rather than standing out that is dangerous. This type of villainy is also evident in his chosen weapon. Unrecognized even when it is present, the harmful bacterial culture threatens to disappear into the crowd with its thief. Wells thus repeatedly uses the idea of evasiveness or visual trickery: the Bacteriologist—a man who, by means of the microscope, sees the invisible—is tricked by a dissimulating visitor who exploits the scientist’s self-regard—how he sees himself—to get a tour of the laboratory. The Bacteriologist doesn’t see the quick hand of the Anarchist who snatches the sample while his back is turned. In turn, the scientist’s substitution of a less harmful sample tricks the Anarchist into thinking that he has stolen ‘King Cholera’ itself. As Willis has argued, having achieved ‘its position as one of the pre-eminent scientific instruments’, the refined microscope does not overcome the ambiguities of the weaker mid-century technology, but extends them.²³ In Wells’s story the technology does not generate clear vision, as it purports, but proliferates misdirection and confusion: the ambiguities of the microscope slide are the source, rather than the resolution, of the story’s plot.

¹⁹ Wells, ‘Stolen Bacillus’, p. 202. Other than as the object of the Bacteriologist’s experiments, the likely use of the bacterium is unstated.

²⁰ We may contrast this with bacteriology’s sustenance of the very different discourse of fairies, as recently shown in Laura Forsberg, ‘Nature’s invisibilia: the Victorian microscope and the miniature fairy’, *Victorian Studies: an interdisciplinary Journal of Social, Political, and Cultural Studies*, 57.4 (Summer 2015), 638-666.

²¹ *The Fin de Siècle: A Reader in Cultural History c.1880-1900*, ed. by Sally Ledger and Roger Luckhurst (Oxford: Oxford University Press, 2000), p. 199.

²² Wells, ‘Stolen Bacillus’, p. 197.

²³ Willis 2011, p. 11. Willis provides important discussion of this, focussing especially on an earlier phase of microscopy on p. 18. His analysis of *Dracula* identifies a similar exploitation of the discrepancy between sight and comprehension in a Gothic context.

The appearance of the bacteriologist in fiction is often significant because of the discrepancy that it reveals between the perceptions of the expert and the newly 'lay' audience who, having always been vulnerable to germs, are now also at the mercy of specialized experts. Thus, Wells's *Bacteriologist* shows the Anarchist some samples but takes advantage of the fact that to see what is usually invisible is not necessarily to know what one is looking at. When the Anarchist looks at the sample he responds that there is 'Not so very much to see after all [...] And yet those little particles, those mere atomies, might multiply and devastate a city!'²⁴ His wonderment at a disparity between size and potency is misplaced: the dead and stained bacteria are exactly as harmless as they appear. Formally speaking, though, this moment is folded into a narrative structure whose final reveal is that the reader has also not been 'seeing' what they thought they saw. Where the reader sees what seems a climactic chase by a crusading microbe hunter, he is later shown to have seen only a vain boffin trying to avoid tedious labour. When the Anarchist, viewing the bacterial culture, says that 'I see very little', requiring the scientist to refocus the microscope, he unwittingly speaks for the reader.²⁵ In turn, the *Bacteriologist's* explanation of his technology also speaks of the different perspectives and unequal understanding of the reader and the story's characters: 'perhaps the microscope is out of focus for you. Eyes vary so much. Just the fraction of a turn this way or that'.²⁶ Wells thus finds in bacteriology a structural kinship with the 'turns' of the tensely-wound short story, the text's late twist transforming the events from a race to save a city to an ambivalent depiction of a morally ambiguous figure. The *Bacteriologist* is not, I suggest, an agent of security against a new bioterrorism, nor, as Tina Choi has argued, a man on whose domestic tranquillity danger is visited from outside.²⁷ Rather, as a citizen with a private laboratory, he is, as Willis has shown, one of those morally suspicious individuals working beyond the oversight of institutional regulation.²⁸ The *Bacteriologist's* materials are a poorly-guarded danger; any perceived heroism is unwitting if not outright illusory; and his own motivating ideology is as inscrutable as that of the Anarchist he both resembles and enables. 'The Stolen Bacillus' establishes the practice of the bacteriologist as questionable, his morality as distorted by his microscope, and his expertise as a cause of risk rather than security.

²⁴ Wells, 'Stolen Bacillus', p. 195.

²⁵ Wells, 'Stolen Bacillus', p. 195.

²⁶ Wells, 'Stolen Bacillus', p. 195.

²⁷ Tina Young Choi, *Anonymous Connections: The Body and Narratives of the Social in Victorian Britain* (Ann Arbor: University of Michigan Press, 2015) pp. 140-3.

²⁸ Martin Willis, 'Unmasking Immorality: Popular Opposition to Laboratory Science in Late Victorian Britain', in *Repositioning Victorian Sciences: Shifting Centres in Nineteenth-Century Thinking*, ed. by David Clifford, Elisabeth Wadge and Alex Warwick (London: Anthem, 2001), pp. 207-18.

The story's final twist uses comedy in a complex and pointed manner. Less evident to modern than to historical readers, the infection's threatened blueness is not merely an amusing deflation of the Anarchist's plot. The blueness is uncomfortably close to the colourful associations of infectious diseases: yellow fever, black death, white plague and, crucially, the 'blue cholera', named after the cyanosis of its final stages.²⁹ The resemblance between the harmless, unintended symptoms caused by the stolen bacillus and the final stage of the Anarchist's wished-for cholera is, then, a terrible one. The likely outcome of turning victims blue renders the criminal enterprise a farcical spectacle, but also reminds us that this has been the near perfect rehearsal of a successful biological terror attack. Wells uses this humorous resolution to balance the prevention of the intended crime against the possibility of catastrophe: this story depicts disaster averted, but also shows that disaster itself would be indistinguishable until too late. Replicating the numerous dramas of misidentification central to the text's plot, the story's resolution is the most disquieting of all; there is little to tell apart a terror attack with no fatalities from one with millions.

The resemblance of the incidental and intended effects of the stolen bacillus casts a new light on comical gestures elsewhere in the text. Upon first discovering the theft the Bacteriologist exclaims 'Blue ruin!', making both a pun and a prediction, balancing the idiomatic with the literal, and the light-hearted with the deathly.³⁰ Similarly, dashing about half-dressed is both a low gag about unworldly scientists, and a vivid illustration of a lack of shared values: the Bacteriologist's embarrassing dash is a mindless rather than a principled show of social dissent. Interested only in his own projects rather than the sartorial and moral norms of his city, he sees in the theft not a potential epidemic nor a dangerous mass panic, only a lost sample to be prepared again. The story's tension also relies on an ambiguous use of humour whereby the Bacteriologist's inconvenience has the same narratological import as a terrorist attack: the reader can experience the story's twist only because the chase has been pursued with an urgency that equates biological cataclysm and a lost lab sample. Under the cover of a joke using Kantian incongruity—it wasn't cholera after all!—the scientist's sense of disproportion satirizes the dangerously distorted vision integral to his profession.³¹ The reader's amusement is soured by a certain complicity with the bacteriologist: carried along with the chase we have momentarily lost our sense of proportion

²⁹ Edmund Charles Wendt lists 'blue cholera' as a name for the Asiatic cholera in *A Treatise on Asiatic Cholera* (New York: William Wood, 1885), p. xii.

³⁰ Wells, 'Stolen Bacillus', p. 197.

³¹ In the *Critique of Judgement* Kant develops a theory of humour that functions with the reversal, or more properly the dissolution, of expectation: 'Laughter is an affection arising from the sudden transformation of a strained expectation into nothing', Immanuel Kant, *Critique of Judgement*, trans. by John H. Barnard (New York: Cosimo, 2007), p. 133.

and, with the scientist, rendered the infinitesimal supreme. Wells's story reorients the reader away from the critical association between bacteriology and colonial threat observed by Otis, establishing the bacteriologist as a figure whose profession renders him morally myopic and vulnerable to political terrorist exploitation.

T. Mullett Ellis's extravagantly-plotted, melodramatic novel *Zalma* (1895) presents a catalogue of conservative anxieties: about standards of sexual behaviour, Roman Catholic plots against English liberty, the morality of aesthetic trends, vivisection, trade unionism and workers' politics, bacteriology, child vaccination, and anarchist terrorism. At the story's climax the eponymous female protagonist is, after a series of ignominious liaisons and injustices, moved by revengeful grief for her anarchist father to organize a terrorist plot. Instead of resorting to dynamite or assassination, she plans to disperse anthrax over the principal cities of Europe using balloons. The text draws on contemporary anti-vivisection writing—exemplified by the work of Frances Power Cobbe, whose autobiography had been published in 1894—to assert that 'Bacteriology and Vivisection are twins'.³² A Berlin-trained bacteriologist whom *Zalma* meets, Dr Adern, is also a keen vivisectionist, not only using animals to test cultured bacteria but to study pain, starvation, and the function of discrete brain areas. A staunch advocate of scientific progress, which he believes should be untrammelled by regulation, Adern describes the cultivation of anthrax and its potential effects, not only revealing his own amorality but planting the idea for *Zalma*'s bioterrorism. Adern is, subsequently, horrified to discover that *Zalma* has used his work to produce vats of bacteria in order to conduct a terrorist attack. Susan Hroncek has recently traced the novel's denigration of female scientists in the person of *Zalma*, the narrator attributing her authority to a form of witchcraft whereby she draws on invisible powers from the mesmeric to the sexual.³³ I suggest that this gender-based reading of *Zalma* is reinforced by the narrator's painstaking distinction between the psychological and practical authority of the two bacteriologists. *Zalma*'s huge stores of anthrax contrast with Adern's small cultures; she is repeatedly described as insane, while he, the institutional embodiment of good biosecurity, is trusted with the final destruction of her anthrax stores: 'we take precautions: the plugs are sealed.

³² Ellis, *Zalma*, p. 304. Recent critical work on antivivisection includes Keir Waddington, 'Death at St Bernard's: Anti-vivisection, Medicine and the Gothic', *Journal of Victorian Culture*, 18.2 (2013), 246-62; and Susan Hamilton, 'Reading and the Popular Critique of Science in the Victorian Anti-Vivisection Press: Frances Power Cobbe's Writing for the Victoria Street Society', *Victorian Review: An Interdisciplinary Journal of Victorian Studies*, 36.2 (2010), 66-79.

³³ Susan Hroncek, "'They Would Take Me for a Witch or a Poisoner': Marginalization and the Woman Scientist in *Fin-de-Siècle* Speculative Fiction', *Nineteenth-Century Gender Studies*, 12.3 (Winter 2016) <<http://www.ncgsjournal.com/issue123/hroncek.htm>>. [Accessed 3 October 2017].

We sterilise everything'.³⁴ *Zalma* initially shows the male bacteriologist to be morally dubious, but redeems him as he helps to neutralize the greater danger of the female bacteriologist. Bacteriology is always hazardous, the novel shows, but female-practised bacteriology is especially so.³⁵

If *Zalma* voices fears of the misuse of science—'the power that Science has placed in the hands either of the ignorant, the debased, or even of the insane'—it also mounts a stronger anti-bacteriological argument.³⁶ Less naïve than Wells's Bacteriologist, Adern exhibits science's corrupting effects: 'his feelings were entirely blunted, and [...] he was totally indifferent to the infliction of suffering'.³⁷ Adern advocates vivisection and experimentation on children: 'A few might be tubercularized with great advantage to the progress of knowledge. Cultures of cholera and other diseases might be introduced and developed, and by the use of germicides the children inoculated with the cholera bacillus might probably recover'.³⁸ *Zalma* too practises vivisection, not to learn but with the explicit purpose of 'dulling her beautiful instincts of gentleness and choking all those human feelings which had flourished in her heart', and so preparing her for the cataclysm her plot will cause.³⁹ If vivisection hardens the sympathies, bacteriology has its own specific moral danger, distorting the moral perspective with microscopy itself. Adern adopts a perspective that shrinks the dignity and value of the human by magnifying the microbe: 'Humanity in the gross he affected to regard as so many enlarged microbes, which would increase and multiply, have their little day, and cease to be'.⁴⁰ Seeing 'innumerable political problems' down the microscope, he repeatedly emphasizes 'the lavish waste in nature', which is one of the 'facts which have not yet been applied in the political field'.⁴¹ The identification of microscopic and human states means that he is not only a practical source for a biological weapon, but voices the same cold logic as the anarchists who wish to effect a revolution regardless of the human cost. Thus, the government agent Charles St Leger dreads 'an outbreak', using the term in both pathological and political senses.⁴² If vivisection actively deafens the scientist to suffering, bacteriology diminishes the human to a microscopic bacterium, whose life

³⁴ Ellis, *Zalma*, p. 421.

³⁵ The hostile reception of this novel by the scientific community, including a review in the *British Medical Journal*, is discussed in James F. Stark, *The Making of Modern Anthrax, 1875-1920: Uniting Local, National and Global Histories of Disease* (London: Pickering & Chatto, 2013), pp. 73-4.

³⁶ Ellis, *Zalma*, p. 393.

³⁷ Ellis, *Zalma*, p. 306.

³⁸ Ellis, *Zalma*, p. 10.

³⁹ Ellis, *Zalma*, p. 392.

⁴⁰ Ellis, *Zalma*, pp. 134-5. This 'affectation' is, I suggest, one of rhetoric and not of sentiment. Adern's persistent equation of the microscopic and the human fits with his insensitivity to suffering.

⁴¹ Ellis, *Zalma*, p. 298.

⁴² Ellis, *Zalma*, p. 405.

can then be lightly destroyed. This moral warping is, moreover, embodied in Adern's curious build. He is a 'provokingly diminutive man', a description echoed by his 'engaging and modest way of belittling himself in conversation'.⁴³ Adern is, then, well-suited to his subject, which he views through a microscope that resembles bacteria themselves: 'small, but extremely powerful'.⁴⁴ Adern's small body is, however, combined with 'a ludicrously large head' and 'ridiculously bass voice', giving the sense of a man of weird proportions, a cousin to the anarchists with their 'hideous aspect' and malformed morals.⁴⁵ Harnessing the emotive controversy of vivisection, *Zalma* makes explicit the specific dangers of bacteriology, most particularly using microscopy to show bacteriologists as bodily and morally warped figures, their science giving greater power and diminished moral responsibility. *Zalma* sees the socially-estranged female as especially dangerous, linking the cruelty of her anarchist politics with bacteriology, showing in both affiliations the capacity to grant the individual the ability to destroy the larger social organism.

II. A German Science

W. L. Alden's story 'The Purple Death', published in January 1895 in *Cassell's Family Magazine*, develops Wells's and Ellis's depictions of a weaponized bacteriology by situating the science in the domain of international politics. Contributing regularly to the same publications as Wells, especially *Pall Mall Magazine* and *Pearson's Magazine*, Alden is likely responding to Wells's equally colourful epidemic, and aiming at a similar audience.⁴⁶ Alden's title, 'The Purple Death'—which anticipates the name given to the influenza epidemic of 1918—is also the name of the story's disease, and refers to a cholera-like cyanosis whereby 'the body [...] becomes purple before death'.⁴⁷ While visiting the Riviera, Alden's narrator stays next door to an elderly German, Professor Schwartz, a physician dedicated 'to the study of bacteriology'.⁴⁸ Schwartz is seen digging in his garden at night, piquing the curiosity of the narrator who finds that Schwartz is burying numerous dead rabbits and guinea pigs. Alden's story, in common with *Zalma*, thus connects the vivid horrors of vivisection to the more obscure practice of bacteriology, Schwartz revealing that he has cultivated an especially deadly bacterium with which to cut the world's

⁴³ Ellis, *Zalma*, p. 306, p. 304.

⁴⁴ Ellis, *Zalma*, p. 133.

⁴⁵ Ellis, *Zalma*, p. 134, p. 34.

⁴⁶ Alden defended his 'involuntary plagiarism' having written verse unwittingly close to the published work of another, and self-plagiarized an article. He concludes, 'These two experiences have made me very slow to believe a man guilty of plagiarism' (W. L. Alden, 'Wisdom Let Loose', *Pearson's Magazine*, March 1896, pp. 289-93 (p. 293)).

⁴⁷ W. L. Alden, 'The Purple Death', *Cassell's Family Magazine*, January 1895, pp. 112-19 (p. 116). Republished in *The Mystery of Elias G. Roebuck and Other Stories* (London: A. D. Innes, 1896), pp. 228-49.

⁴⁸ Alden, 'Purple Death', p. 113.

population by two thirds. Worse than any known disease, this new bacterium, which Schwartz, evoking ‘King Cholera’, calls ‘the king of all diseases’, has been bred to unprecedented virulence by combining different microbes.⁴⁹ Espousing a Malthusian rationalism superficially opposed to the anarchism of Wells’s terrorist, Schwartz asserts that overpopulation is the cause of vast misery. A deadly plague among the working classes would, he states, ‘cure’ this more fundamental problem. The story concludes with the narrator’s realization that while Schwartz has died without releasing the bacteria, the delicate tube remains stuck in the scientist’s *rigor mortis*-stiffened grasp. The narrator must bury bacteriologist and culture together, leaving the disease to live indefinitely in a tube of ‘teeming gelatine’.⁵⁰ In this conclusion, Alden emphasizes the invisible and enduring threat: the microscopic bacteria remain undeclared and undying in the hand of a buried man. Finally, the narrator glances forward to the prospect of a future earthquake, which will disturb the burial and release the disease.

Unlike Wells’s, Alden’s bacteriologist is German and is actively malevolent rather than naïve. Rather than an unwitting tool for radicalism, bacteriology is, as in *Zalma*, shown to be a dangerous political force. Although not an explicit invasion story in the manner of *The Battle of Dorking* (1871) or *The Riddle of the Sands* (1903) Alden’s story links the new disease to contemporary international enmities. Schwartz boasts:

Think what would happen, were we Germans to use these microbes in our next war with France. A single bomb filled with the Purple Death, and thrown within the lines of a French army, would render a battle an impossibility. Before six hours were over there would not be left in an army of four hundred thousand men survivors enough to bury the dead!⁵¹

Schwartz’s interest in the supposedly global population crisis—the narrator initially claims that Schwartz’s ‘philanthropy was not bounded by any of the limitations of race or creed. The sufferings of the poor touched him as profoundly, whether they were Germans, Italians, or Frenchmen’—is not so disinterested that the bacterium might not be directed at a rival European nation before it is distributed more widely. The universal good of global depopulation, Schwartz implies, may still be conducted in the special interests of Germany.⁵² Christoph

⁴⁹ Alden, ‘Purple Death’, p. 116.

⁵⁰ Alden, ‘Purple Death’, p. 116.

⁵¹ Alden, ‘Purple Death’, p. 116.

⁵² Alden, ‘Purple Death’, p. 113. The fears of these texts were not wholly unfounded: Germany seems to have been the first state to use a bacteriologically prepared biological weapon, trying to infect horses due to be imported into

Gradmann has shown how popular depictions of bacteriology in *fin-de-siècle* Germany often pictured the science as an arena for European political antagonism.⁵³ Alden's story shows the equivalent trend in English fiction, and so indicates the decline of Britain's 'splendid isolation': Schwartz represents to a British reader not a generic anarchist oddball, but a specifically German antagonist against whose violent plot the British narrator must intervene to protect Europe. Moreover, Schwartz's concern with overabundant population voices, paradoxically, a profound anxiety among Germany's rivals about the rapid growth of the German population. The censuses of 1891 and 1901 showed the United Kingdom's and, even more severely, France's populations falling far behind that of Germany, whose rapidly growing industrial economy, expanding navy, and increased colonial possessions, endangered the post-Napoleonic European political settlement.⁵⁴ Alden's story updates the negative connotations of bacteriology, combining the growing tensions of European politics with the individual danger posed by transnational anarchists.

Alden's story foregrounds the specific danger of modern bacteriological methods. Bacteria are a new weapon for a new type of warfare: they give to an individual an unprecedented power and so reproduce the radical imbalance of scale and potency that bacteria themselves exhibit. Bacteria and terrorists alike evade scrutiny until the infection has been contracted and begun to cause damage. This characteristic is a source of notable excitement for Schwartz, who remarks on the meagreness of the mechanism of infection and the magnitude of the effects:

I can, with merciful swiftness and with absolute certainty, reduce the population of Europe to a half, or a third, of what it now is. I have only to take my Purple Death, and scatter the teeming gelatine on the side-walk of the most crowded street of your London. It will dry quickly, and under the trampling of hundreds of feet it will become pulverised, and the particles will float in the air. That very day the physicians will find themselves in the

Entente countries with glanders during the First World War. *Weapons of Mass Destruction: An Encyclopaedia of Worldwide Policy, Technology, and History*, Vol. 1: Chemical and Biological Weapons, ed. by Eric A. Croddy and others (Santa Barbara, CA: ABC Clio, 2005), p. 143.

⁵³ Christoph Gradmann, 'Invisible Enemies: Bacteriology and the Language of Politics in Imperial Germany', *Science in Context*, 13.1 (Spring 2000), 9-30.

⁵⁴ Population figures from R. C. K. Ensor, *England: 1870-1914*, Oxford History of England, ed. by George Clark, (Oxford: Oxford University Press, 1936), p. 269. Ensor also describes over a broader narrative the ebbs and flows of anti-German opinion based on foreign policy, military escalation, industrialization, and population. A more recent account of the period's politics can be found in T. G. Otte, *The Foreign Office Mind: The Making of British Foreign Policy, 1865-1914*, (Cambridge: Cambridge University Press, 2011). The crisis of French 'depopulation' in this period of German expansion is treated in Karen Offen, 'Depopulation, Nationalism, and Feminism in *Fin-de-Siècle* France', *The American Historical Review*, 89.3 (June 1984), 648-76.

presence of a disease wholly unknown to them, and against which medical science can achieve nothing.⁵⁵

Schwartz's comments evoke the perennial metaphor of the body politic: just as a bacterium kills an organism a million times its size, the political radical destroys the social organism in which he lives, whether community, city, or state. This is done, moreover, by releasing the invisible germ where it will be quickly dispersed by people's transit through the city; the downtrodden 'working-classes and the poor' are thus transformed into the vectors of their own eradication.⁵⁶ Alden equates the bacterium and the terrorist in order to communicate the particular nature of these twinned dangers, which are infinitely more potent than their size suggests.

Schwartz's nationality is primarily ascribable to the enduring German genealogy of bacteriological science. The creator of the classification system for bacteria was German, most of the discoveries of pathogens for infectious disease were German, and the science was dependent upon the technological developments of German microscopy effected by Carl Zeiss, Otto Schott and Ernst Abbe.⁵⁷ Semantically, bacteriology was a German import into English. The first use of the term 'bacteriology' was in the *Athenaeum* in 1884, whose anonymous correspondent reports on the proceedings of the International Medical Congress in Copenhagen, writing, 'In Germany [this branch of knowledge...] has become a separate study under the name of bacteriology'.⁵⁸ The first technical manual in English, Crookshank's 1886 *An Introduction to Practical Bacteriology*, announces in its subtitle that it is 'based upon the methods of Koch' and acknowledges scientists almost exclusively working in German institutions.⁵⁹ Bacteriology's German complexion was complicated by the political developments of the late nineteenth and early twentieth centuries, especially by growing militarism in Western Europe. The aggression between France and Germany, heightened by the Franco-Prussian war, was metastasized as a scientific rivalry, especially between Pasteur and Koch, both of whom were directly sponsored by their respective states and thus became embodiments of national ambition. This scientific rivalry was recognized in Britain, 'Our Doctor' describing in *Strand Magazine* in 1913 how

⁵⁵ Alden, 'Purple Death', p. 116.

⁵⁶ Alden, 'Purple Death', p. 116.

⁵⁷ As well as Robert Koch, discoverer of the microbes causing tuberculosis and anthrax, and rediscoverer of cholera, we can list, for example, Ferdinand Cohn who created the bacteriological classifications, Karl Joseph Ebert who discovered the typhoid bacillus in 1880, and Edwin Klebs and Friedrich Löffler discovered the diphtheria microbe in 1883.

⁵⁸ [Anon.], 'The International Medical Congress', *The Athenaeum*, 30 August 1884, pp. 279-282 (p. 281).

⁵⁹ Edgar M. Crookshank, *An Introduction to Practical Bacteriology based upon the methods of Koch etc.* (London: H. K. Lewis, 1896).

German professors discover one anti-bacillus, anti-serum, and synthetic chemical remedy after the other, against all and every disease; and, not to be outdone, a French professor vouchsafes to prolong our life by means of sour milk.⁶⁰

As the antagonisms that drew Europe towards the Great War grew, national identity increasingly inflected the characterisation of bacteriology in British writing.⁶¹ This rivalry did not, however, generate a consistent stigmatization of bacteriology in all fields: periodical advertisements show a positive set of associations that develop concurrently in the same periodicals.

III. Selling Bacteriology

‘The Purple Death’ reinforces repeated fictional portrayals of the bacteriologist as a violent and criminal political radical. But the periodical advertisements and scientific notices alongside which such stories appeared reveal a different cultural valency, associating the bacteriologist with scientific innovation and improved public health. *Cassell’s Family Magazine* provides an especially good example of the diverse meanings that could attach to bacteriology for an audience. In 1895, issues of the periodical include Alden’s bacteriologist story, as well as notices and advertisements that explicitly refer to bacteriology. The audience is, therefore, assumed to be interested in bacteriology as a cultural practice as well as a fictional motif. The long-running column ‘The Gatherer: An Illustrated Record of Invention and Discovery’ documents early bacteriological science, including developments in ‘Disinfecting Rooms’, ‘Freeing Water from Microbes’, and ‘Inoculating for Cholera’.⁶² In July 1895, six months after Alden’s story, the column records how ‘M. Physalix, a French bacteriologist, has succeeded in creating or “breeding” a new variety of microbe by cultivation’ derived from anthrax.⁶³ This scenario closely resembles that described by Alden, but is here presented with the positive connotations of the latest scientific novelty,

⁶⁰ Our Doctor, ‘Our Nerves’, *Strand Magazine*, May 1913, p. 36.

⁶¹ Looking beyond the Anglophone, I would like to draw attention to the 1905 stories of Santiago Ramón y Cajal, published in English as *Vacation Stories: Five Science Fiction Tales*, trans. by Laura Otis (Champaign, IL: University of Illinois Press, 2001). Written under the pen name Dr Bacteria, the first of the stories relates how a German bacteriologist suspicious of his wife’s infidelity with a laboratory assistant infecting the assistant with tuberculosis and using its transmission to ascertain their subterfuge. This narrative of infidelity and jealousy constitutes another distinctive context—beyond the scope of this article—within which the bacteriological is repeatedly deployed, to which I would add W. Somerset Maugham’s novel *The Painted Veil* (1925) and Rudolph de Cordova, ‘The Microbe of Death’, *Pearson’s Magazine*, (November 1897), 464–74.

⁶² [Anon.], ‘Disinfecting Rooms’, *Cassell’s Family Magazine*, April 1885, p. 316; [Anon.], ‘Freeing Water from Microbes’, *Cassell’s Family Magazine*, October 1885, p. 702; [Anon.], ‘Inoculating for Cholera’, *Cassell’s Family Magazine*, August 1895, p. 718. The column was later subtitled ‘Invention, Discovery & Science’.

⁶³ [Anon.], ‘A New Microbe’, *Cassell’s Family Magazine*, July 1895, p. 637.

alongside new designs of sunshades and studies of raising puppies under coloured light. Even in this most uncanny of echoes of ‘The Purple Death’ there is no suggestion that the bacteriologist is a malevolent or even an ambiguous character. If bacteriology is often shown as foreign, here this is not associated with danger, as it is in Alden’s short story. The framing of the scientific notice suggests that bacteriology carried no tainted connotation of political violence or adversarial nationalism. Rather, bacteriology’s cultural significance was sufficiently undetermined that it could, according to the wishes of the author and publisher, be inflected with favourable or troubling political associations.

The patent medicine advertisements that run alongside the stories of bacteriologists give an important indication of the *Cassell’s* reader’s limited exposure to bacteriology and its specialist practitioners. Throughout the *fin de siècle* nostrums continued to be advertised without reference to recent bacteriological discoveries, suggesting that manufacturers discerned limited marketing power in the new science. The gradual evolution of adverts for Eno’s Fruit Salts, for example, left the central claims unaltered from the 1880s to at least 1905, when the company still boasted of the product’s removal of ‘foetid or poisonous matter (the groundwork of disease)’.⁶⁴ Equally impervious to bacteriological ideas, Owbridge’s Lung Tonic promised to relieve not only coughs and colds but, improbably, ‘Whooping cough, asthma, consumption and bronchitis’.⁶⁵ These adverts run repeatedly for over a decade from 1885 and are unaffected by, for example, the high-profile discovery of the tuberculosis bacillus in 1882. If bacteriology represents a scientific breakthrough, popular enough to prompt notices describing bacteriologists and their achievements, the trend was neither so widespread nor potent that patent medicine manufacturers felt compelled to adopt the new language. Poor blood, ineffective digestion, and damaged nerves remained the dominant aetiologies addressed by most nostrum advertisements from the 1880s into the twentieth century.⁶⁶ At this time the bacteriologist, we may surmise, was a recognizable but not a ubiquitous cultural figure. This balance, whereby the bacteriologist’s significance was legible but not self-evident, granted fiction the required latitude within which to forge the figure’s negative associations.

If bacteriology was not so pervasive as to be an irresistible framework for nostrum manufacturers, its influence is visible in advertisements for a number of cleaning products. In

⁶⁴ [Anon.], ‘Eno’s Fruit Salt’, *Cassell’s Magazine*, December 1905, inside cover.

⁶⁵ [Anon.], ‘Owbridge’s Lung Tonic’, *Cassell’s Family Magazine*, March 1896, p. ‘B’.

⁶⁶ Indicative of this partial permeation of germ theory, when *Zalma* falls ill in Ellis’s 1895 novel, she is not infected, rather ‘Her nervous, emotional nature, highly wrought upon by the mental crisis, was much tried [and] She had an attack of hysteria’ (Ellis, *Zalma*, p. 111).

Cassell's in June 1895 we find 'Sanitas' disinfectant, which 'Kills All Disease Germs', while Wright's Coal Tar Soap claims to protect from fevers, measles, smallpox, and, crucially, carries professional endorsements from the *Lancet* ('MOST EFFECTIVE IN SKIN DISEASES') as well as a claim to be 'THE ONLY TRUE ANTISEPTIC SOAP – BRITISH MEDICAL JOURNAL.'⁶⁷ The advertisement of the specifically antibacterial properties of domestic products marks an important phase in the public comprehension of sanitation and of the bacteriology that informs it. Most compelling in this respect is the advertisement for Lifebuoy Royal Disinfectant soap in *Cassell's* in January 1895, which makes very detailed and positive bacteriological claims only forty pages after Alden's 'The Purple Death'. [Figure 1. Caption: [Anon.], 'Lifebuoy Royal Disinfectant Soap', *Cassell's Family Magazine*. Bodleian Library, University of Oxford, Per. 256 d. 256, January 1895, p. iii.] This coincidence demonstrates the coexistence of contradictory qualities in the figure of the bacteriologist himself, speaking to a readership capable of finding bacteriology alternately worrisome and reassuring, risky and safe. The Lifebuoy advert is highly bacteriologically literate, implying the reader's appreciation, if not necessarily comprehension, of the value of bacteriological testing.⁶⁸ On the right-hand side of the already wordy advert—the company's sailor mascot is shrunk to the upper left portion of the feature—are the results of tests in Hamburg's Hygiene Institute. The soap, we are told, has been 'brought to bear on a variety of clean cultivated germs or microbes (Bacillus)' and found successful in killing Typhoid, Cholera, Diptheria and carbuncle (Staphylococcus) microbes.⁶⁹ The advert is especially revealing because it does not use a generic, scientific authority figure but gives extensive details of specifically bacteriological practice. It records the precise strength of soap solutions tested, the use of a fixed period of time for exposing cultures, the source of the bacteria ('Cholera Microbes [...] taken from persons who had died of Cholera in Hamburg'), and sorts the results according to time and solution strength.⁷⁰ Referring to 'clean cultivated germs', the advert exploits bacteriology's characteristic use of pure cultures. The last of these gestures sees the advert perform a type of semantic cleansing, whereby even deadly pathogens can now be described as 'clean', affording bacteriological procedure positive if paradoxical connotations. This degree of detail lends the advert a resemblance to a specialist scientific report, concluding with the 'signature' of Dr Karl Enoch, a scientist from the institute, as a mark of authority and

⁶⁷ [Anon.], 'Sanitas', *Cassell's Family Magazine*, June 1895, p. 84. [Anon.], 'Wright's Coal Tar Soap' *Cassell's Family Magazine*, July 1895, Back cover. The equivalent 1886 advert is less specific: 'PRESCRIBED BY THE ENTIRE MEDICAL PROFESSION FOR THE CURE OF SKIN DISEASES. PROTECTS FROM MEASLES, SMALL POX & SCARLET FEVER' ([Anon.], 'Wright's Coal Tar Soap', *Cassell's Family Magazine*, November 1886, p. H).

⁶⁸ This familiarity contrasts sharply with an 1885 instalment of *Cassell's* 'Family Doctor' column, where the use of the word 'germ' is met with 'You talk like a book my friend' ([Anon.], 'A Family Doctor', *Cassell's Family Magazine*, December 1885, p. 214.)

⁶⁹ [Anon.], 'Lifebuoy Royal Disinfectant Soap', *Cassell's Family Magazine*, January 1895, p. III.

⁷⁰ 'Lifebuoy', p. III.

authenticity. The reader of *Cassell's Family Magazine* is, by extension, cast as an educated and discriminating consumer, who would purchase Lifebuoy having appraised the latest specialist research. Where the adverts for Eno's Salts and Owbridge's Tonic offer reassurance of the efficacy of their products, Lifebuoy's advert operates in part by flattering the scientifically-informed discrimination of its potential customers.

The use of scientific detail implies a belief in the potential consumer's capacity to engage critically with, or at least trust, scientific enquiry. Instead of avoiding the bacteriologist because of any pre-existing negative connotations, the advert flatters its audience, giving them an unusual and perhaps superfluous quantity of specialist information with which to assess the product's desirability. This is, I suggest, a part of the broader ameliorative social strategy of the Port Sunlight-based Lever Bros., who also add details of a free book scheme to the advertisement, offering a vision of a literate and auto-didactic audience. This faith in the intelligence and discrimination of the consumer is further suggested by the subsequent use of the bacteriological report on every soap wrapper, implying that the information was either important or at least reassuring for the customer. Published alongside 'The Purple Death' in the January 1895 issue of *Cassell's Family Magazine*, Lifebuoy's advertisement shows the capacity of the bacteriologist and his expertise to carry positive as well as negative connotations for the same lay readership. Whether the bacteriological detail is used to express good faith in the consumer's knowledge and interest, or whether it is used more cynically as a jargon-rich information barrage to signify high standards, Lifebuoy's bacteriologist and his imprimatur carry no perceptible cultural taint from contemporaneous fiction.

The untrustworthiness of bacteriologists was not, we may therefore understand, a universal association in 1895, but one that competed in the same space with a number of other characterizations, including Lifebuoy's use of the German bacteriologist as a guarantor of sound scientific practice, domestic cleanliness, and modern efficiency. This association supports Jan Rüger's wider observation that British culture before the First World War generally shows 'an open-minded attitude' towards Germany, rather than the suspicious or hostile stance that growing Anglo-German antagonism invites.⁷¹ The malevolent bacteriologist of short stories and novels may exploit broader political concerns, but it does so not by using a ready-made negative association. Fiction featuring bacteriologists generates its own cultural momentum; it gathers the forces of extraneous political tensions to inflect with conspiratorial and violent characteristics a

⁷¹ Rüger, p. 588.

sub-species of scientist acquiring new public attention. The bacteriologist's visibility to the lay reader was matched, I suggest, by a character sufficiently pliable and unfamiliar to bear a coherent range of non-scientific anxieties. These constructions were, however, neither poorly limned nor generic iterations of evil scientists, but exploited an increasing public awareness of bacteriological practice, principally the use of the microscope and the cultivation of powerful microbial cultures, to develop forms of criminality well-fitted to the fear of political violence.

The growing public appreciation of bacteriology's positive inflections, as communicated by scientific notices and advertisements, does not, then, mark a turning point in the depiction of bacteriologists in fiction. Algernon Blackwood's story collection *The Listener* (1907), elaborates the figure of the villainous bacteriologist in 'Max Hensig: Bacteriologist and Murderer: A story of New York.' Based on the case of Carlyle Harris, a medical student who murdered his wife using morphine pills, Blackwood makes two crucial changes to his text: Hensig is rendered a bacteriologist and strikingly, even comically, German. Blackwood thus revivifies the identification of bacteriology with German aggression found in Alden's 'The Purple Death'. Boastful while in custody, Hensig is a cartoonish villain with a clumsily transliterated accent:

'What is more easy,' he said, holding the bars with his long white fingers and gazing into the reporter's eyes, 'than to take a disease germ ('cherms' he pronounced it) of typhus, plague, or any cherm you please, and make so virulent a culture that no medicine in the world could counteract it; a really powerful microbe — and then scratch the skin of your victim with a pin? And who could drace it to you, or accuse you of murder?'⁷²

By making these changes Blackwood transforms the story of Carlyle Harris from a domestic murder to an act of violence with international political resonance, using the new science as an agent of prominently German malevolence.

Rather than merely reproducing the bacteriologist's political association, Blackwood's story is significant for its self-conscious engagement with storytelling. The journalist protagonist, Williams, joins in the general excitement at Hensig's alleged murder of his wife, an unnamed character saying

⁷² Algernon Blackwood, 'Max Hensig: Bacteriologist and Murderer: A story of New York', in *The Listener and Other Stories*, (London: Eveleigh Nash, 1907), pp. 51-126 (pp. 65-6).

‘He’ll make good stuff at the trial. I never saw a cooler hand. You should’ve heard him talk about poisons and bacteriology, and boasting he could kill in a dozen ways without fear of being caught. I guess he was telling the truth right enough!’⁷³

Hensig is described as both a dangerous spectacle and an inscrutable menace, likely to prove a compelling presence in court, while his ‘face wore so open an expression that one would have said he could not twist a kitten’s tail without wincing’.⁷⁴ Hensig’s boastfulness is not a confession of guilt but a gesture of defiance: he gets off the charge despite newspaper stories that he believes paint him in a negative light. Haunted by Hensig’s unemotional confidence, Williams considers the German ‘something outside humanity’.⁷⁵ In this respect Hensig resembles the object of his own study, living among humans while remaining uncannily distinct, and his company accordingly takes on a pathogenic quality. The narrator describes how ‘Williams, as he watched and heard, was glad the bars were between them; but, even so, something invisible seemed to pass from the prisoner’s atmosphere and lay an icy finger on his heart’.⁷⁶ This sense of contagion continues when, having returned to the United States after a summer in Germany, Hensig tries to murder the reporter by infecting him with typhus carried on a pin disguised to look like a pencil. In a tense climax, the narrative winds to literal fever pitch: Williams seems woozy with drink, fatigue and fear, but beneath this alert and determined. Finding himself scratched as Hensig is apprehended, he assumes this has been caused by the deadly pencil, and finally passes out. His illness turns out not to be typhus but a bout of ‘nerves’, which passes within a few weeks. Nevertheless, this compelling conclusion is itself a self-aware gesture, metafictionally using narrative tension—excitement transmitted via the writer’s pencil—as contagious material; the anxiety of the reporter is ‘caught’ by the reader as the story oscillates thrillingly between the prospect of safe and tragic resolution. Blackwood’s story not only strengthens the association between German violence and bacteriology, but exhibits a self-awareness that foregrounds the mechanisms of the short story via its infectious plot, its journalist narrator and its theatrical villain. ‘Max Hensig’ is, I suggest, about storytelling as much as the German threat, finding in bacteriology not only a politically-inflected villain but, foremost, a theme that allows for a flamboyant presentation of the storyteller and his craft. This self-reflective quality further suggests, I contend, that the recurring presentation of bacteriology as immoral, conspiratorial and violent is a literary and not a universal motif.

⁷³ Blackwood, ‘Max Hensig’, p. 60.

⁷⁴ Blackwood, ‘Max Hensig’, p. 56.

⁷⁵ Blackwood, ‘Max Hensig’, p. 66.

⁷⁶ Blackwood, ‘Max Hensig’, p. 66.

If ‘Max Hensig’ shows the bacteriologist story achieving new self-awareness and developing the association of bacteriology and German aggression, a further consideration of advertisement confirms the ongoing commercial credit of real German bacteriologists. Less than a year before the outbreak of war the *Strand* in March 1913 displayed a full-page advertisement for Wulfig’s Formamint, openly celebrating its German bacteriological accreditation. It states prominently that it ‘was awarded the Grand Prix at the Great International Hygiene Exhibition at Dresden, 1911 – representing the highest medical and scientific opinion in the world.’⁷⁷ [Figure 2. Caption: [Anon.], ‘Wulfig’s Formamint: The Germ-Killing Throat Tablet’, *Strand Magazine*, Bodleian Library, University of Oxford, Per. 2705 d. 272, March 1913, p. 1.] Even in 1913, therefore, where Wulfig’s advert depicts germs as a cloud-like airborne threat, the Anglo-German antagonism is not sufficient to see the authority of the German bacteriological institute devalued by contemporary jingoism. Strikingly, there is little change between Lifebuoy’s 1895 citation of the Hamburg Hygiene Institute’s report and the references given to Formamint’s recognition in Dresden in 1913. While the dangerous bacteriologist recurred in fiction—including Doyle’s 1913 text, addressed earlier—the enduring commercial prestige of bacteriological institutes demonstrates the restricted currency of this association. Even amidst the growing nationalism of popular magazines such as the *Strand*, German bacteriology remained a reliable signifier of scientific modernity until the beginning of the war. Combined with the self-referential quality that we can see in Blackwood’s story, the prominent use of German bacteriology in advertising in 1913 suggests the stability of both personae: the villainous bacteriologist motif in fiction, and the expert tester of advertisement culture. While such stories and adverts provided exposure and revenue for one another in the economy of the *fin-de-siècle* periodical, there is no sense of cross-contamination.

Only with the idiomatically pathological ‘outbreak’ of war do we find bacteriology acquire a problematic identity in advertising. As with other domains subject to nationalist marketing, the rear cover of *The Sphere* 21 November 1914 features an advert for Peps as ‘*The BRITISH CURE for Throat and Chest*’. [Figure 3. Caption: [Anon.], ‘Peps’, *The Sphere*. Bodleian Library, University of Oxford, N. 2288 b. 34, 21 November 1914, back cover.]. It says,

Peps are, in fact, a valuable and immediate antiseptic and germicide for the throat, and unlike products containing formalin or other strong drugs, they do not and

⁷⁷ [Anon.], ‘Wulfig’s Formamint: The Germ-Killing Throat Tablet’, *Strand Magazine*, March 1913, p. 1.

cannot inflame the throat. So-called throat tablets, imported, many of them, from the laboratories of harsh German chemists, are absolutely worse in their effects than the ailments they set out to cure, and are by far best left alone altogether.⁷⁸

With the outbreak of war, bacteriology, signalled with reference to antiseptics and germicide, becomes freighted with political connotations. No longer identified as bacteriologists per se, it is German chemists and not their chemicals whom the advertisements judge 'harsh', blending personal with material hazard. By contrast Peps foregrounds its organic origins: Pine Extracted Pastilles are presented as a wholesome British discovery with gentle but effective properties.⁷⁹ The prowess of German bacteriology, trumpeted in 1913 as guarantor for Formamint's potency, becomes in 1914 the 'harsh' synthesis of inappropriately potent chemicals in imported products. There is, however, little sense that this late, limited, and generic use of bacteriology in anti-German advertising is informed by fiction's recurring villainous bacteriologist motif. Sharing the sentiment but not the style of fictional portrayals, Pep's criticizes bacteriology as an incidental element in the broader sweep of nationalism found in wartime propaganda.

IV. Conclusion

British fiction and advertising attributes opposing qualities to the bacteriologist's cultural character. The fictional depictions constitute a coherent trend that exploits the characteristics of the new science, especially the use of microscopes and the cultivation of pathogenic microbes, to construct the bacteriologist as a dangerous individual whose moral framework is distorted by his science. Whether as a perilously self-absorbed figure whose cultures are stolen, as in 'The Stolen Bacillus', or as a dangerous terrorist in his own right, as in Alden's 'The Purple Death', the bacteriologist is shown to be the natural ally of the political terrorist. Comparison with positive references to bacteriology in contemporaneous advertising suggests that this association was not universally perceived, and that the bacteriologist, if referred to at all, had as much currency as a reassuring embodiment of scientific modernity as they did as violent terrorists, even among the same audience. This bifold character implies both the limited capacity of fiction to shape broader cultural understanding of an emergent science, but also the self-sustaining potency of fiction's

⁷⁸ [Anon.], 'Peps', *The Sphere*, 21 November 1914, Back cover.

⁷⁹ This claim of antiseptic and germicidal potency had already been debunked in the British medical press. A 1911 *British Medical Journal* article found Peps to contain 70% sugar, 25% liquorice extract, 4% talc, 0.7% 'resinous matter', and trace oils of peppermint and anise. Addressing Pep's claim to use pine as an antiseptic, the advert concludes 'some sort of pine extract might have been present if it were free from resin or oil, but in that case it could not be expected to possess much medicinal value', [Anon.], 'The Composition Of Certain Secret Remedies. Medicines For Cough, Catarrh, Etc.', *The British Medical Journal*, 2.2658, (9 December 1911), 1543-1546 (p. 1543).

dangerous bacteriologist motif. The public profile of the bacteriologist was sufficiently malleable that he could be repeatedly harnessed by fiction to stage the concerns of anarchism and German militarism while simultaneously serving the interests of scientific reports and advertisements. Finally, the persistence of the malevolent bacteriologist motif also communicates the particular fertility of bacteriology for reflections on storytelling, whereby fiction repeatedly uses the idea of microscopic hazards and exclusive expertise to heighten its mechanisms of misdirection, misrecognition, and ‘infectious’ narrative tension.

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